Repair Conditions

1. Parts that can be repaired.:
   •Internal electronic circuitry
   Damage caused by incorrect connection, inter-terminal shorting, or driving is not covered by warranty.
2. Note that this device will not be covered under warranty if the housing has been opened.
3. ACUVANCE assumes no responsibility for damage to the receiver or servo caused by the incorrect connection of this product.
4. Note that if the repair card (located below) or the repair sheet (on the homepage) is not properly filled out, repair and return of the ESC may be delayed.

Warranty

Item Manufacture no.	Advanced Interactive-com Brushless ESC TACHYON AIRIA	Purchase date	(M/D/Y) / /
		Warranty term	3 months from purchase date
Customer Address E-mail Phone number	(@) Tel. no.		
Name			

Note that if the date and location of ESC purchase are not entered on the warranty card, you will be charged for repairs even within the warranty term.

- If a failure occurs within three months of purchasing the ESC, write the symptoms of the problem and operating conditions in the section below and attach this to the product. For repair, send the ESC to the distributor where you purchased the product or directly to ACUVANCE (Technical Service Department).
- ACUVANCE assumes no responsibility for damage or losses that occur during transportation. Please take note of this beforehand.
- When listing the symptoms for a repair request, you can conveniently use the repair request sheet on the ACUVANCE homepage and then send this along with the warranty card.
  (Click the "repair" section located in the upper-right side of our homepage. Then click "repair request sheet", located on the left side.)

Repair card

1. Symptoms

Write the symptoms of the problem, giving as much detail as possible.

2. Payment for repair charges

☐ There is no need to contact me, if the charges are at or below 5,250 yen, no contact is necessary

☐ I would like to be contacted if there is compensation

* Though it depends on the details of the repair, indicating in advance that no contact is necessary will normally shorten the time is takes to complete the repair.

ACUVANCE CORPORATION
Technical Service Dept.

7F, Shin-Osaka Marubiru Annex 1-18-22
Higashinakajima Higashiyodogawa-ku
Osaka 533-0033 Japan.

www.acuvance.co.jp
E-mail support@acuvance.co.jp

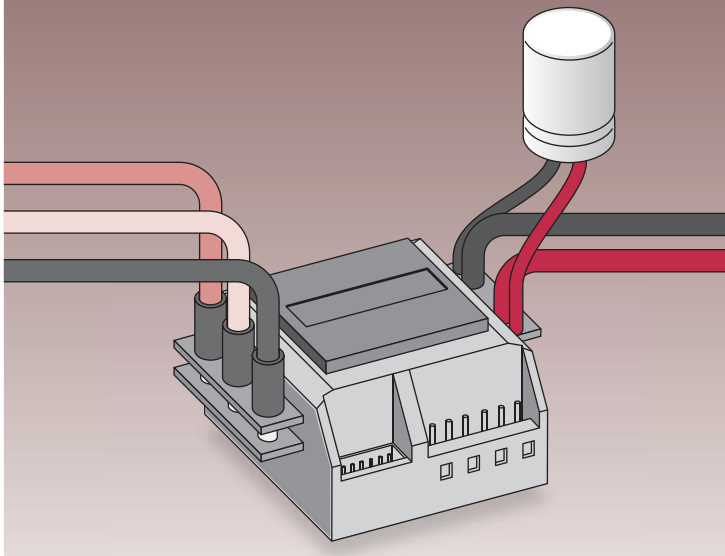
Distributor's name
(shop name, address, and tel. no.)

0413-6

TACHYON AIRIA

Advanced Interactive-com Brushless ESC

INSTRUCTION MANUAL



ACUVANCE

PRECAUTION FOR USE

⚠WARNING Before using this product, carefully read the important warnings described in this instruction manual to understand the instructions thoroughly.

- **⚠ DANGER** Instructions that the user must observe to prevent serious injury.
- **⚠ WARNING** Instructions that the user must observe to prevent accidents.
- **CAUTION** Useful information for handling this product.

About batteries

⚠ DANGER To prevent fumes, fire, or burns

Improper use of the battery is very dangerous. The battery must be handled carefully. Incorrect wiring or short-circuiting of wiring may cause fire or fumes. Before connecting or disconnecting the battery to or from the speed controller (ESC), be sure to turn off the power switch of the ESC. When the battery is not in use, disconnect it from the ESC or charger, and store it in a suitable location free of any loose wires or screws.

About cable Connections

⚠ DANGER To prevent fumes, fire, or burns

Incorrect wiring may cause fire or fumes that can damage both the ESC and battery beyond repair.

About special ceramic board

⚠ DANGER To prevent burns

The surface of the special ceramic board will be extremely hot after heavy load driving. Do not touch the special ceramic board directly.

Handling precautions

⚠ WARNING To avoid accidents or product failure

Do not modify the ESC in any way. Use it only for its intended purpose. Keep the ESC away from flames or seat. Avoid splashing any liquid, such as water, on the ESC.

FEATURES

- Features ACUVANCE's original H.T.R.S* (patented), a hybrid design based on a special thermal conductive carbon sheet and special heat-dissipating ceramic board that efficiently cools all FET components inside the ESC.
  The only brushless ESC in the world that eliminates the need for heat sinks and cooling fans.
- The small body has been laid out with 24 of the latest power MOS-FET components.
  This optimizes the circuitry to achieve high efficiency while supporting reverse braking.
- Push button controls on the ESC allow you to disengage reverse braking and change drive frequency, brake volume, and other settings.
  Users can add a dedicated effector (sold separately) that significantly expands the range of available settings and ranges for a personal driving experience.
- Equipped with boost turbo, which expands the range of settings to match course layouts.
- The settings support visual confirmation of non-boost zero timing via LED as well as non-boost regulation.
- The "sensor cable", "receiver cable", and "switch cable" are detachable.
  This makes it possible to easily replace cables when they break and allows you to select the length of the cable to match the layout (when using optional parts).
- Supports "SSR mode", a Sanwa Denshi Co. Ltd. original system.

*H.T.R.S.: Hybrid Thermal Radiation System (patented)
World's first Hybrid Thermal Radiation System* cools all FET components evenly and more efficiently than a cooling fan and heat sink.

Specifications

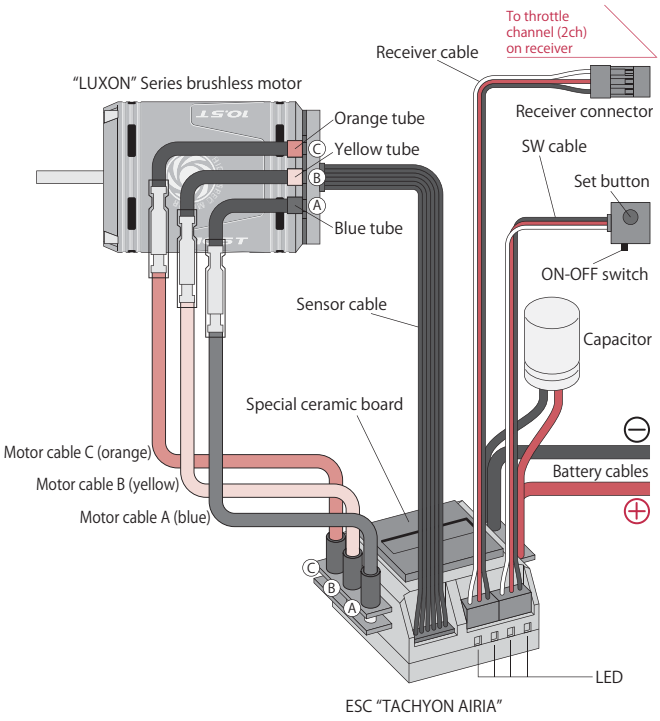
Power supply	6.0 V to 11.1 V (works with any battery)
Continuous and spontaneous maximum current	Max. current of battery
ON resistance	0.3 mΩ (FET standard value)
Compatible motors	Sensored motor - unrestricted (when boost turbo is disabled)
Dimensions	W31 × D31 × H21 mm
Weight (ESC unit)	39.8 g
Regulator for receiver/servo	6 V 3 A output

INDEX

⚠ DANGER To prevent fumes, fire, or burns

Be careful not to reverse the battery poles. Doing so can cause the ESC to fail.

Connect as illustrated below.



Sensor cable

This cable transmits position signals to the ESC using a Hall element. The connector has the same shape on both the ESC side and the motor side, allowing it to be plugged in either direction. It should however be connected to the proper shape. This cable must be connected in order to initialize the ESC. Be sure the connector fits snugly to prevent loose connections which can cause malfunctioning and product damage. Never modify the uncap sensor cable. Doing so may cause product failures.

⚠ WARNING If the sensor cable is not connected, has not been properly inserted, has been disconnected, or is loosely connected, all the LEDs will blink (high-speed blinking). While in this state, all operations will not be received. If this occurs, check the connection for the sensor cable or replace the cable.

Switch cable/receiver cable

The switch cable and receiver cable are detachable. By using optional parts (sold separately), the length of these cables can be changed and they can be easily replaced when they become damaged or broken.

⚠ WARNING When inserting the connector, pay attention to the way in which it is being inserted. If inserted backwards, the device will not operate.

Motor cable (A, B, C)

These cables apply voltage to the motor coil following a timing based on the signals transmitted to the ESC via the sensor cable. The LUXON is pre-fitted with cables terminated with bullet type connectors allowing connection to our ESC TACHYON AIRIA without soldering.

⚠ WARNING Be sure to match the cables to the symbols A, B, and C on the ESC. Failure to follow this precaution can result in loss of control over the motor speed, or subject the ESC and motor to large currents. Unlike brushless motors without a sensor, swapping these cables does not change the rotating direction of the motor. If necessary, change the direction of rotation at the ESC*.

* To change the rotating direction, the ESC must be equipped with a feature for changing the rotating direction. The TACHYON AIRIA is equipped with this feature (p.15)

⚠ WARNING When replacing the motor cable, use a soldering iron with a broad tip and high output rating (as high as 60 W) and work swiftly. A soldering on with the low output rating will not melt enough of the solder resulting in a poor soldering connection which can cause cables to loosen under vibration or loose connections. Also, subjecting the internal parts to excessive heat over prolonged periods (10 seconds or more) can damage them. (Be careful not to short-circuit the terminals with solder)

⚠ WARNING Use only screws 8 mm or shorter to mount the motor to the motor mount.

Hint KEYENCE offers sensor cables, receive cables, and switch cables of various lengths as optional parts (sold separately).

When using this product for the first time, the neutral position on your transmitter and the ESC do not match. If you attempt to drive your car before completing the initialization, the motor may start rotating as soon as the switch is turned on.
This is extremely dangerous and can be prevented by performing the procedures that follow in "Initializing the transmitter throttle position" when turning the power on for the first time. (The motor will not rotate during the initialization).

Initializing the transmitter throttle position

The ESC must be programmed with the transmitter's neutral position, forward MAX position, and reverse (brake) MAX position immediately after purchase, or if the transmitter has been replaced. Perform the following steps.

Preparations Before performing this setting, set all transmitter throttle settings (EPA= end point adjustments, MAX brake volume, etc.) to their original state. Otherwise, the ESC will not detect the transmitter signals properly, preventing it from being initialized.

Preparations When performing the initial setting, be sure that the sensor cable is connected to the motor and ESC.
If the sensor cable is not connected, has not been properly inserted, has been disconnected, or is loosely connected, all the LEDs will blink (high-speed blinking).
Check the connection for the sensor cable or replace the cable as all operations will not be received while it is in this state. Also, in addition to when performing the initial settings, the sensor cable should always be connected when the vehicle is being driven.
The three motor cables (A, B, C) may be left disconnected but be careful to not have the cable connectors touch each other as they will short.

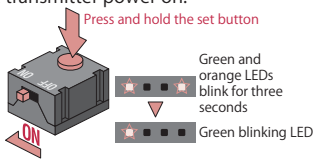
Preparations If performing the initial settings with the motor cables connected, secure the motor in a motor mount or other device, and remove the pinion gear to keep the car from moving unexpectedly.

How to calibrate **Supports SANWA super response <SSR> mode**

*"SSR mode" is an original system from Sanwa Denshi Co. Ltd.

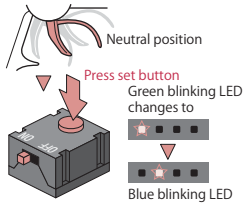
1 <<Before making calibration>>
Be sure the ESC power is turned off, and make sure the ESC is properly connected to the battery, motor (only the Sensor cable needs to be connected), and receiver. Then turn the transmitter power on.

2 <<Calibration mode>>
Press and hold down the set button while turning the ESC power on. The green and orange LEDs will blink for three seconds, and then the green LED will start blinking indicating that the ESC is in initial setting mode. Release the set button.

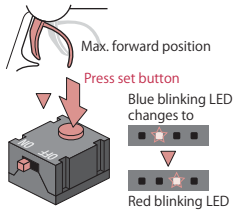


*At this time, it will be automatically determined if the receiver possesses SSR mode.

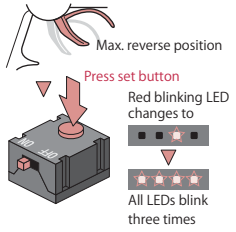
3 <<Setting the neutral point>>
While the green LED is blinking, set the throttle on the transmitter to its neutral position and press the set button on the ESC once. The blue LED will start blinking.



4 <<Setting the high point>>
While the blue LED is blinking, set the throttle on the transmitter to the maximum forward position and press the set button on the ESC once. The red LED will start blinking.
* If the red LED does not blink after pressing the set button with the throttle at the maximum forward position, set the throttle to the maximum reverse (brake) position and then press the set button once.



5 <<Setting the brake high point>>
While the red LED is blinking, set the throttle on the transmitter to the maximum reverse position of Step 4, and press the set button on the ESC once. All LEDs will blink three times.



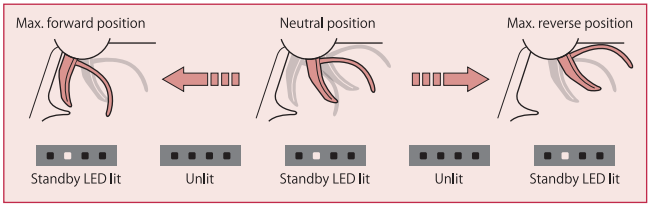
This completes the initial settings for the transmitter positions. The ESC automatically changes to the standby mode (p. 8).

IMPORTANT If you performed the procedure described by the * under Step 4 above, <<Setting the high point>>, switch the throttle channel on the transmitter between normal and reverse after completing the initial setting for all transmitter positions.

Caution The throttle position for the transmitter may become misaligned due to changes or deterioration over time.
If the LED lights are flashing while the ESC is in standby mode, readjust the initial settings for the transmitter.

Verifying the transmitter positions have been correctly set to their initial settings

The standby LED (see below) should be the only one illuminated when the throttle is in the neutral, maximum forward, and maximum reverse (brake) positions. If the standby LED is unlit in all other positions, the initial setup has been completed properly. (The standby LED is the only LED that alternately illuminates and goes out when adjusting the throttle)

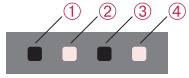


If the standby LED does not follow this lighting pattern, the initial setting was not completed properly. Make sure the throttle related adjustments on the transmitter are initialized and the RX cable is properly connected to the receiver. Then, retry the initial setting procedure.

* Depending on the configuration of vehicle parts, the car may move in reverse when the throttle is operated in the forward direction.
If your car displays this behavior, change the rotating direction of the motor (P. 15).

Checking standby mode

At time of shipment, the standby mode is as shown in the figure on the right. Each LED has the following meaning.



Standby mode at time of shipment

①LED <green>: Factory shipped condition = unlit
If the battery voltage lowers to the cutoff voltage (P.15) while driving, the green LED will blink and the car will drive at extremely low speeds. If this occurs, replace the battery.

②LED (blue): Factory shipped condition = lit
Standby LED when setting mode (p.10) is in ESC mode. Unlit during Program Card mode.
* Under "ESC mode" ,LED <Blue> was blinking when the Program Load (P.12) was selected
"Boost/Turno Disabled", or both "Full Boost Timing" (P.16) and "Full Turbo timing" (P.17) were selected "Disabled".

③LED (red): Factory shipped condition = unlit
Standby LED when setting mode is in Program card mode. Unlit during ESC mode.
* Under "Program Card Mode" ,LED <Red> was blinking when the "non boost" was selected,or both "Full Boost Timing" (P.16) and "Full Turbo timing" (P.17) were selected "Disabled".

④LED (orange): Factory shipped condition = lit
Illuminated when the reverse drive feature (p.15) is set to ON. Unlit when set to OFF.
*If the ESC heats ro a provision tempareture whilw driving, the motor will keep low speed and the Orange LED will blink. If this situation occurs, discontinue operation until the ESC returns to room temparerture.
If the Orange LED starts blinking after driving for only a brief period, check to see if the gear ratio settings are overloading the motor.

[Important] Safety feature for driving in reverse

On radio-controlled cars, the same throttle controls are used for braking and driving in reverse. This can cause the car to move backwards when the intention is to apply the brakes. Suddenly trying to reverse the motor while it is rotating forward can place severe stress on the gears, motor, and ESC, sometimes resulting in internal damage. The TACHYON AIRIA is equipped with the following feature to prevent this. After applying the brakes, before reversing, the ESC will wait 1 second or more for the throttle to return to neutral and for the motor to go from rotating in a forward direction to coming to a complete stop (it will not go into reverse within the span of 1 second).
In this way, even if the reverse drive feature is set to ON, the ESC ensures that any throttle operation in the braking direction results in braking and no unintentional reversing. This feature prevents damage to the drive parts and collisions with other cars, as well as many other possible problems, and is essential to allow short braking action when turning corners.

*Note, this safety feature cannot be disabled.
However, as detailed in [Reverse drive ON/OFF and motor rotating direction selection] (P.15), when configuring crawler-oriented settings, vehicle movement that occurs once the throttle is placed in the brake position will be specialized for reverse driving (the brake will not work), thus disabling this function.

This completes the preparation before driving. Connect the motor and enjoy driving.

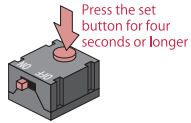
* When using lithium polymer batteries, set the cutoff voltage before driving, to 3.2 V/cell (1 recommended) (p. 15).

Selecting setting modes

First, select either [ESC mode] or [Program Card mode].
Select ESC mode to adjust various features on the ESC, or Program Card mode to change function settings for the effector. At time of shipment, ESC is set to ESC mode.

Selecting setting modes

1. In the standby mode, press and hold the set button four seconds or longer.
2. The LEDs (blue and red) alternately blink indicating the setting mode is now active.

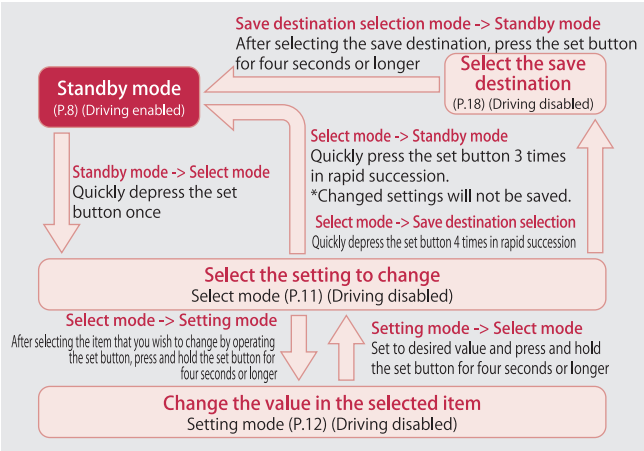


Repeating the same procedure alternates between [ESC mode] (blue) and [Program card mode] (red).

Important The items, numerical setting ranges and units of adjustment differ depending on the mode selected (p. 12 to 18). Refer to the following section for setting procedures in ESC mode, or the instruction manual supplied with the effector for setting procedures in the Program Card mode.

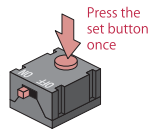
Flow for changing settings and ESC mode

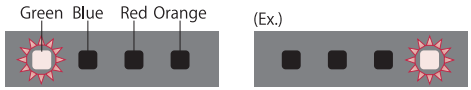
*If the initial settings have not been completed then the following procedures cannot be performed.



Select mode (when Setting mode = ESC mode)

In Standby mode (p. 8), quickly depress the set button once. The green LED will start blinking indicating the ESC is in Select mode. (While in Select mode, the motor will not rotate even if the transmitter throttle is operated.)





Select mode (blinking green LED)

Neutral brake power adjustment is selected (blinking orange LED)

Each short press of the set button causes a different LED to blink and display the settings that are currently selected (for details on these settings, refer to the items listed below). Also, two short presses of the set button will return the settings to the previous item. (refer to the display for the set button located at the top of the flow chart on P.20)

Blinking LED pattern indicates the current setting item
(Each setting is described in detail on the following pages).

- [Green] Load program
- [Blue] Drive frequency adjustment
- [Red] Initial speed adjustment
- [Orange] Neutral brake power adjustment
- [Green + blue] Initial brake power adjustment
- [Blue + red] Full brake power adjustment
- [Red + orange] Cutoff voltage adjustment
- [Green + red] Reverse drive ON/OFF and motor rotating direction selection
- [Green + orange] Full boost timing adjustment
- [Blue + orange] Boost start rpm adjustment
- [Green + blue + red] Boost power adjustment
- [Blue + red + orange] Full turbo timing adjustment
- [Green + red + orange] Turbo power adjustment
- [Green + blue + orange] Turbo start time adjustment

[Verifying current settings]

To view the current setting, enter Select mode, then toggle the blinking LED to the desired setting item. Wait two seconds. The LED indicating the setting item and the LED that indicates the value for that item will alternately blink or illuminate.
(Five blinks indicates the setting item <-> An illuminated LED indicates the setting value)

* Pressing the set button once returns to Select mode.
* Refer to P.12 to 18 for the meaning of each LED display.
* With "Load program", "LEDs that display the currently set value" won't always be displayed.

Settings mode (in ESC setting mode)

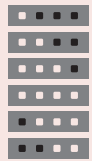
Changing to Settings mode

While in Select mode (p. 11), move the LED to the setting to be changed using the set button. Press and hold the set button four seconds or longer. This activates the Settings mode. (While in Settings mode, the motor will not rotate even if the transmitter throttle is operated.)
The current mode can be determined by the LEDs that are flashing.
*Refer to the flowchart (P.20, P.21)

①Load program (green LED)

In select mode, make the green LED blink and then press the set button for 4 or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the programs seen in the figure on the right. Set the LED to the desired program and then press and hold the set button for four or more seconds.
This confirms the program and returns the green blinking LED of select mode.
It is also possible to load a preset program and change each function to your favorite setting.

- Drift
- Touring
- Off-road
- Boost/Turbo Disabled
- User program①
- User program②



User programs

- These are areas that recall each item that has been set on the TACHYON AIRIA. There are 2 types of recall areas (user program (1) and (2)) within the TACHYON AIRIA but when even more program recalls are necessary, use the separately sold specialized program card.
- It is possible to save individual settings and save after to a user program after all settings have been performed.

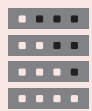
Caution If the power is turned off without saving to a user program, the setting data will not be remembered.

Important When "Boost/turbo disabled" is selected, the boost and turbo functions (described later in item (9)) cannot be used. In this case, (9) through (14) in select mode, will be skipped. Also, the timing is fixed at 0°.

②Setting the drive frequency (blue LED)

In select mode, make the blue LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the drive frequencies seen on the right.
Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off.
To retain the settings, use the Save feature before turning the power off (p. 18)

- 2 KHz
- 4 KHz
- 8 KHz
- 16 KHz



Explanation As the numerical value decreases, [punch power increases and the smoothness of acceleration decreases], and as the numerical value increases [punch power decreases and the smoothness of acceleration increases]

③Setting the Initial speed (red LED)

In select mode, make the red LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the initial speeds seen on the right.
Set the LED number to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (p. 18).

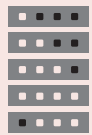
- 0%
- 10%
- 20%

Commentary This is the speed at the instant that acceleration begins. As the numerical value of the initial setting becomes larger, the speed at which the throttle lever decreases will increase. Setting the initial speed too high will cause tire spin or cause the gears to become chipped, so set the initial speed to an appropriate value.

④Setting the neutral brake power (orange LED)

In select mode, make the orange LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the neutral brake power as seen on the right. Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode.
Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (p. 18).

- Level 1 0%
- Level 2 10%
- Level 3 20%
- Level 4 30%
- Level 5 40%

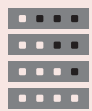


Commentary This adjusts the braking force that is applied once the throttle has been returned to neutral. As the numerical value of this setting becomes larger, the braking force increases.

⑤Setting the initial brake power [green + blue LED]

In select mode, make the green and blue LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the brake power as seen on the right. Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (p. 18).

- Level 1 6%
- Level 2 14%
- Level 3 20%
- Level 4 30%



Commentary This adjusts the brake power that is applied once the throttle is placed in the brake position. As the numerical value of this setting becomes larger, the initial braking force increases.

⑥Setting the full brake power (blue + red LED)

In select mode, make the blue and red LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the full brake power as seen on the right.

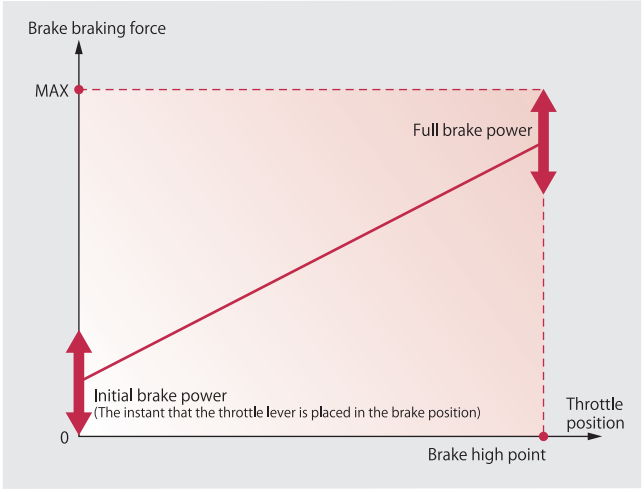
- Level 1 70%
- Level 2 80%
- Level 3 90%
- Level 4 100%

Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (p. 18).

Commentary: This adjusts the brake power once the throttle has been put into full brake. As the numerical value of this setting becomes larger, the braking force that occurs when full break is used, increases in strength.

Advice

The braking force that is applied by the brake when the throttle is in an intermediate area corresponds to both the initial brake power (item (5)) and full brake power (item (6)) as seen in the figure below.



⑦Setting the cutoff voltage (red + orange LED)

In select mode, make the red and orange LED blink and then press the set button for four or more seconds to enter Settings mode.

- Disabled
- 2.6 V/cell
- 3.0 V/cell
- 3.2 V/cell
- 3.4 V/cell

Each short press of the set button causes the LED lighting to change and these changes will correspond to the cutoff voltages seen on the right. After making the LED for desired cutoff voltage light up, continue by then pressing the set button for four seconds or longer. This switches the settings for the cutoff voltage and returns to Select Mode. To make the cutoff feature take effect, save the settings using the Save feature (P.18), and cycle the power.

Commentary: This function informs the driver that the voltage is low to prevent the car from going out of control when the battery runs low. If the voltage of the battery connection terminal voltage for the Tachyon reaches the cutoff voltage, the green LED will blink and the car will drive at an extremely low constant speed. When set as "disabled", this function will not operate and the battery may become damaged.
If set to "disabled", pay close attention to the driving time and other such conditions.

Reference: Because the number of connected battery cells is automatically recognized, select the cutoff voltage for one cell. If set to "disabled", pay close attention to the driving time and other such conditions.

⑧Reverse drive ON/OFF and motor rotating direction selection (green + red LED)

Make the green and red LEDs blink in Select Mode and then press the set button for four seconds or longer. Each short press of the set button causes the LED lighting to change and these changes will correspond to the settings seen on the right. Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (p. 18).

- Positive rotation: Forward/brake
- Positive rotation: Forward/brake/reverse
- Positive rotation: Forward/reverse (for crawlers)
- Reverse rotation: Forward/brake
- Reverse rotation: Forward/brake/reverse
- Reverse rotation: Forward/reverse (for crawlers)

Commentary: Switches between Positive/Reverse and reverse drive ON/OFF.

Regardless of whether the wiring or initial settings have been properly performed, the car may go into reverse once the throttle has been operated in to the forward position. This is due to the structure of the drive unit for the vehicle, so if this type of condition appears, this function will reverse the rotating direction.

When the reverse drive function is ON, the orange LED will be lit in standby mode.

⚠ Warning: With "crawler-oriented" settings, the brake will not work and the drive will instantly switch between forward and reverse. This function must not be used with non-crawler vehicles. This will cause damage to the ESC, motor, or vehicle (gear type).

TUNING THE DRIVING EXPERIENCE (BOOST/TURBO)

What is the boost function?
This is a function that makes the electronic timing increase in conjunction with the motor rpm to further increase motor rpm.

What is the turbo function?
This is a function that makes the electronic timing increase even further only when in full throttle, to increase motor rpm.

Advice
- If "boost/turbo disabled" has been selected in Load program, the "boost function" and "turbo function" cannot be used.
- If not using the boost/turbo function (when "boost/turbo disabled" has been selected), zero timing will be activated, and while in standby, the blue LED will blink in "ESC mode" and the red LED will blink in "program card mode", so that it can be understand with a single glance that zero timing is active and that boost/turbo is disabled.
- With TACHYON AIRIA, it is possible to operate either the "boost function" or "turbo function" only. (In this case, in Load program, select something other than "boost/turbo disabled".)

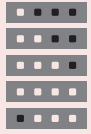
Warning When using "boost + turbo" or "boost" only, use a high-turn motor of 8.5T or higher. Damage caused by using motors with a turn count that is lower than this is not covered under warranty.

Caution In general, the boost/turbo function will overload the ESC/motor. Pay close attention to the heating of the ESC/motor as well as the gear ratio when using these functions.

⑨Setting the full boost timing (green + orange LED)

In select mode, make the green and orange LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the full boost timings seen on the right.
Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode.
Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (p. 18).

- Disabled
- 15°
- 30°
- 40°
- 50°

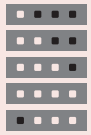


Commentary This determines the maximum value (terminal value) for timing increased through boost.

⑩Changing the boost start rpm (blue + orange LED)

In select mode, make the blue and orange LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the boost start rpm seen on the right.

- 4,000
- 7,000
- 9,000
- 12,000
- 16,000



Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (p. 18).

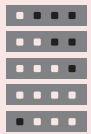
Commentary This determines the motor rpm at which boost will begin to operate. As this rpm value is set lower, boost will operate from a low rotation area.

Caution When set low, it is necessary to lighten the drive load for things such as the gear ratio.

⑪Setting the boost power (green + blue + red LED)

In select mode, make the green, blue, and red LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the boost power as seen on the right.
Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save

- 0.1°/100rpm
- 0.2°/100rpm
- 0.3°/100rpm
- 0.4°/100rpm
- 0.5°/100rpm



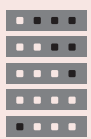
Commentary This determines the rate at which the timing is amplified through boost. As this number value increases, it will be possible to gain greater acceleration power but caution is advised as setting this too high will result in damage to the ESC/motor.

Reference <Ex.> When set to 0.2°/100 rpm, the timing increases 0.2° for every increase of 100 rotations.

⑫Setting the full turbo timing (blue + red + orange LED)

In select mode, make the blue, red, and orange LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the full turbo timings seen on the right.
Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save feature before

- Invalid
- 5°
- 10°
- 15°
- 25°



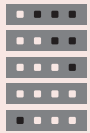
Commentary This determines the timing value that is added when in full throttle.

Important When the boot function and turbo function are used simultaneously, the maximum value to be set for the full boost timing and full turbo timing is a combined total of 60°.

⑬Setting the turbo power (green + red + orange LED)

In select mode, make the green, red, and orange LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the turbo power as seen on the right.
Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (listed below).

- 3°/0.1 sec
- 9°/0.1 sec
- 15°/0.1 sec
- 18°/0.1 sec
- 21°/0.1 sec



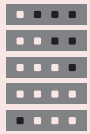
Commentary: This determines the rate at which the timing is amplified through turbo. As this number value increases, the maximum speed will be reached in an increasingly shorter amount of time but caution is advised as setting this too high will result in damage to the ESC/motor.

Reference: <Ex.> When set to 9°/0.1 seconds, the timing increases 9°every 0.1 seconds.

⑭Setting the turbo start time (green + blue + orange LED)

In select mode, make the green, blue, and orange LED blink and then press the set button for four or more seconds to enter Settings mode. Each short press of the set button causes the LED lighting to change and these changes will correspond to the turbo start times seen on the right. Set the LED to the desired setting and then press and hold the set button for four or more seconds. This confirms the settings and returns to Select Mode. Settings are reset when the power is turned off. To retain the settings, use the Save feature before turning the power off (listed below).

- Invalid
- 0.15 sec
- 0.3 sec
- 0.45 sec
- 0.6 sec



Commentary: This determines if how many seconds later turbo will be operated after full throttle has been selected.

Saving the user program (current settings)

In select mode, quickly press the set button 4 times to make all the LEDs blink. After this, it will automatically switch to a display to select the save destination for the user program. The green LED is user program (1) and the orange LED is user program (2). Each press of the set button will switch the save destination. After selecting the save destination, pressing and holding the set button for four seconds will save the user program and return to standby mode.

Commentary: The saved user program can be loaded in the previously mentioned Load program.

List of initial setting values

...Adjustable items

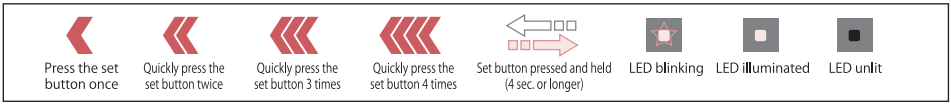
Function	ESC settings mode	Preset program			
		Drift	Touring	Off-road	Boost/turbo Disabled
Drive frequency	4 levels	16 KHz	2 KHz	4 KHz	16 KHz
Brake frequency	Cannot be changed	8 KHz	2 KHz	2 KHz	8 KHz
Neutral brake frequency	Cannot be changed	16 KHz	8 KHz	1 KHz	16 KHz
Initial speed	3 levels	10%	10%	20%	0%
Neutral brake power	5 levels	20%	20%	20%	20%
Initial brake power	4 levels	30%	30%	30%	20%
Full brake power	4 levels	100%	100%	100%	100%
Cutoff voltage	5 levels	3.2 V/cell			
Forward top speed	Cannot be changed	100%			
Reverse top speed	Cannot be changed	25%			
Reverse and brake switching	Switchable	Forward/brake/reverse			
Motor rotating direction	Forward/reverse rotation	Forward rotation			
Full boost timing	5 levels (including disabled)	Disabled	30°	Disabled	※
Boost start rpm	5 levels	4,000	9,000	4,000	
Boost power	5 levels	0.1°/100rpm	0.2°/100rpm	0.1°/100rpm	
Full turbo timing	5 levels (including disabled)	5°	25°	5°	
Turbo power	5 levels	3°/0.1 sec	9°/0.1 sec	3°/0.1 sec	
Turbo start time	5 levels	0.15 sec	0.15 sec	0.15 sec	
Timing advancement	Cannot be changed	0°			
Number of user programs	2				

* When "boost/turbo disabled" has been selected, boost and turbo related settings cannot be used (this functions will be skipped in setting mode).

Preset programs at time of shipment

At time of shipment, this device is set to the preset program [Drift] (Refer to the chart above for the setting values for each item). Adjust individual setting values as desired (Refer to P.10 to .18 for how to adjust settings).

SETTINGS FLOWCHART FOR ESC MODE



How to Calibrate (P.6)

Press and hold set button while turning power on

After the LED (green + orange) blink for 3 seconds, LED (green) will blink

Initial setting of transmitter throttle position (P.6)

Normal operation

Turn power switch on

LED (green + orange) blink 4 times

Standby mode (Driving enabled) (P.10)

ESC mode (blue LED) (Blinking: Boost turbo disabled)

Program card (red LED) (Blinking: Boost turbo disabled)

Press and hold the set button for four seconds or longer to change modes

If not saving

Save destination selection

User program (1) (Green LED)

Each single press of the set button will switch between user program (1) and (2).

User program (2) (Orange LED)

Automatically moves into the save destination selection.

Save program (All LEDs blinking)

If saving

(Caution) Values are reset when the power is turned off. To retain the setting values, make sure to use the "Save Program" feature.

LED color

Green Blue Red Orange

Select mode (Driving disabled) (P.11)

Load program

Drive frequency

Initial speed

Neutral brake power

Initial brake power

Full brake power

Cutoff voltage

Reverse ON/OFF
Motor rotating direction selection

Full boost timing

Boost start rpm

Boost power

Full turbo timing

Turbo power

Turbo start time

Setting mode (Driving disabled) (P.12)

Load program

Drift
Touring
Off-road
Boost turbo disabled
User program (1)
User program (2)

Drive frequency

2 KHz
4 KHz
8 KHz
16 KHz

Initial speed

0%
10%
20%

Neutral brake power

Level 1 0%
Level 2 10%
Level 3 20%
Level 4 30%
Level 5 40%

Initial brake power

Level 1 6%
Level 2 14%
Level 3 20%
Level 4 30%

Full brake power

Level 1 70%
Level 2 80%
Level 3 90%
Level 4 100%

Cutoff voltage

Disabled
2.6 V/cell
3.0 V/cell
3.2 V/cell
3.4 V/cell

Reverse ON/OFF

Forward rotation
Forward/brake
Forward/brake/reverse
Forward/reverse (for crawlers)

Reverse rotation
Forward/brake
Forward/brake/reverse
Forward/reverse (for crawlers)

Full boost timing

Disabled
15°
30°
40°
50°

Boost start rpm

4,000
7,000
9,000
12,000
16,000

Boost power

0.1°/100rpm
0.2°/100rpm
0.3°/100rpm
0.4°/100rpm
0.5°/100rpm

Full turbo timing

Disabled
5°
10°
15°
25°

Turbo power

3°/0.1 sec
9°/0.1 sec
15°/0.1 sec
18°/0.1 sec
21°/0.1 sec

Turbo start time

Disabled
0.15 sec
0.3 sec
0.45 sec
0.6 sec

* When "Boost/turbo disabled" is selected in "Load program", the functions at or below full boost timing cannot be used and will be skipped. In such cases, the timing will be fixed at 0°.

OTHER

(1) This controller is equipped with H.T.R.S., a heat control system that converts heat inside the ESC to infrared rays, and dissipates the heat by radiation. To allow this function to perform effectively, avoid covering the ceramic board with a powered fan or decals. Failure to obey this warning can significantly degrade the performance of the H.T.R.S. and damage the ESC.

(2) If the capacitor supplied with this controller becomes damaged, the internal circuitry may also be damaged, requiring a full repair of the controller. Contact KEYENCE for repair work.

(3) Users can experience improved acceleration, mileage, and other benefits by replacing the capacitor supplied with this controller with our separately sold Chevalier series.

(4) If the batteries are incorrectly connected, the short key diode in between the ESC batteries will become damaged. Be very careful not to connect the batteries incorrectly.

MEMO